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ABSTRACT

Three learning modules are described and investigated as they reflect different students' conceptions of and approaches to learning. The Schoolwork Module (SWM) focuses on task performance and involves a passive, incremental, piecemeal, and rote memory method of learning, parallel to what might be implied by the Information Processing model of memory. The Intentional Learning Module (ILM) is based on the tacit conception of learning as constructive internalization of external knowledge. The learner views the body of external information as privileged expert knowledge to be internalized. The Interest Creating Discovery Module (ICDM) is based on the conception of learning as the reorganization of one's own internal knowledge. An inventory was designed to measure the conceptions of learning corresponding to these modules, and it was administered to 194 undergraduate students. Factor analysis was used. It is apparent that all three approaches are used by college students. Only 8 of the 84 items show significant use of SWM, while 7 show use of ILM, and 15 show significant use of ICDM. ICDM may reflect an incorporation of learning conceptions from SWM and ILM, or ICDM users have reinterpreted the questions within their own approach. Two tables present study data. (Contains 19 references.) (SLD)

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TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

ANALYSIS OF LEARNING CONCEPTIONS BASED ON THREE MODULES

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INTRODUCTION

College students approach learning in different ways. These differences reflect their conceptions of school work. The result of their approaches seems to correlate with their attitude (Biehler & Snowman, 1990; Rogers, Palmer & Bolen, 1987), personality (Jung, 1926; Lawrence, 1982), motivation (Woolfolk, 1993), and their resulting academic success (Chissom, Iran-Nejad & Burry, 1989). What are some of these conceptions of learning and how do students approach academic tasks?

Three Conceptions of Learning

Bereiter (1990) proposed that academic learning occurs in terms of two contextual modules that students use in their approaches to learning: a school work module (SWM) and an intentional learning module (ILM). Students approach academic work either by adapting to school as one would adapt to a job (SWM), or by responding intentionally to difficult learning situations as problems to be solved in the attainment of cognitive goals (ILM). Both of these approaches assume that learning is internalizing the knowledge that preexists outside the learner.

Iran-Nejad (1989; 1990; 1992; 1993) proposed a third interest-creating discovery module (ICDM) from the viewpoint that learning is the reorganization of one's own knowledge, as opposed

to the internalization of external knowledge as suggested by the Bereiter modules. Moreover, ICDM is also a dynamic motivational module because it is the source of interest and discovery. While Bereiter's research seemed to support his two-fold analysis, Iran-Nejad's module was added in a three-fold construct-based inventory to examine the structure of the conceptions underlying approaches to academic learning.

Three conceptions of learning corresponding to the above three modules were measured. Learning as (a) straight internalization of external knowledge (Bereiter's SWM), (b) constructive internalization of external knowledge (Bereiter's ILM), and (c) the reorganization of one's own internal knowledge (Iran-Nejad's ICDM).

The Schoolwork Module

The focus of SWM is task performance, and involves a passive, incremental, piecemeal, and rote memory method of learning, parallel to what might be implied by the Information Processing model of memory, where memory depends on maintenance rehearsal (Gagne & Driscoll, 1988). Ebbinghaus's (1913) view that meaning may confound what is memorized for reproduction, Ausubel's reception learning, and stimulus-response conditioning (Skinner, 1953), where the teacher manipulates the learning process, are not consistent with Bereiter's SWM approach. Such learning is like looking through a camera in order to take a picture. One must be sure of proper focus, zooming closely on the subject to ensure the correct picture gets in the camera.

Compared with the picture-taking process of the human eye, camera picture-taking is slow, limiting in scope, and sequential. The closer the focus, the more limited the span of learning. Learning in the SWM focuses on test-taking and is severely constrained by what Reddy (1979) termed the "conduit metaphors" of human communication.

The Intentional Learning Module

ILM is based on the tacit conception of learning as constructive internalization of external knowledge. It involves a more self-conscious, learning-conscious, approach to learning, active and effortful approach to learning. As in the SWM, learning is an academic exercise, and an attempt to solve the problem of difficult learning. Similar to SCM, ILM still seems to focus on learning for test-taking. The learner still views the body of external information as privileged expert-knowledge to be internalized. The IP model's emphasis on elaborative processing, constructive learning strategies (e.g., Palincsar & Brown, 1984), and Ausubel's (1977) meaningful reception learning are consistent with this conception. While there may be important differences among these learning theories, they are all compatible with Bereiter's ILM.

The Interest Creating Discovery Module

The ICDM is based on the conception of learning as the reorganization of one's own internal knowledge (Iran-Nejad, 1989; 1990; 1992), that two independent sources of internal control regulate learning (1992), and that effective learning is whole-

theme (1989) as opposed to piecemeal. ICDM implies that learning situations must be authentic, as opposed to academic, and is contextual, as opposed to abstract. Learning situations must be designed to promote insight, discovery, and are incidental, as opposed to intentional learning, and involve reflective practice.

PURPOSE/OBJECTIVE

The purpose of this study was to determine if the three modules described here are distinct in that they reflect different students' conceptions of and approaches to learning. Although Bereiter differentiated between SWM and ILM, are these really different? What happens when a third is added to Bereiter's modules? What practical implications may be drawn from the different approaches learners take in academic contexts? The present study was undertaken to:

1. compare and contrast the learning conceptions noted above in order to measure whether or not these conceptions are in fact discrete and support distinct learning approaches;
2. if these learning approaches are discrete, discover which one(s) are employed by undergraduate students;
3. serve as a basis for measuring different learning approaches by undergraduate students comparison with other variables (e.g., GPA, and personality type.

METHOD

A learning conceptions inventory (LCI) was designed to measure the conceptions of learning corresponding to three modules: (a) learning as straight internalization of external knowledge (Bereiter's SWM); (b) constructive internalization of external knowledge (Bereiter's ILM); and (c) the reorganization of one's own knowledge (ICDM). There were altogether 84 items. Twenty-seven categories of questions were developed. Each group had three questions representing each of the three conceptions discussed above. Another group had only two questions, and there was one generalized isolated question. Categories included affect (anxiety), purpose in study, writing term papers, memory, teacher expectations, outcome, metacognitive awareness, and locus of control. Some of the categories were represented more than once. The following are sample questions:

Category #6--"memory":

1. In order to remember something for a test, I repeat it several times until I know it. [SWM]
2. In order to remember something for a test, I try to relate it to something the teacher has said or that I have already read in the textbook. [ILM]
3. In order to remember something for a test, I try to think of a metaphor that will help me recall it. [ICDM]

Category #18--"approach to new material":

1. I like to learn a new subject by carefully memorizing the material one step or increment at a time. [SWM]
2. I like to learn new material by reading though my notes and going back to organize them section by section. [ILM]
3. I like to learn new material by thinking about how it relates to what I am doing or thinking about, and then integrate it into my own ideas and life. [ICDM]

The LCI was piloted with 194 volunteer undergraduate students. The inventory was administered in the subjects' classroom. Instructions asked the subjects to respond to each item as accurately and honestly as possible, and that there are no 'right' or 'wrong' answers. Subjects were asked to rate the questions as TRUE or FALSE.

RESULTS

A factor analysis was used to analyze the data. A scree plot of Eigenevalues revealed that three factors showed significant separation from other Eigenvalues. In other words, a discrete three-factor solution was produced; hence, there were three significant and interpretable factors.

Insert Table 1 about here

Based on factor loadings, fifty-one items loaded on either factor #1, #2, or #3 at a value from .29 and .65. Only items with a coefficient of .29 or higher were used in determining the factors. The 13 SWM items ranged from .32 and .65; the 18 ILM items ranged from .29 and .42; and the 20 ICDM items ranged from .29 and .59.

Insert Table 2 about here

An example of an item that was predicted to load on SWM is as follows (for the sake of comparison, other members of the same category are also presented):

Category #6--Memory

*1. In order to remember something new for a test, I repeat it several times until I know it. [SWM]

2. In order to remember something new for a test, I try to relate it to something the teacher has said or that I have already read in the textbook. [ILM]

3. In order to remeber something new for a test, I try to think of a metaphor that will help me recall it. [ICDM]

Item #1 above loaded on SWM at a value of .44, while not loading on ILM (.07) or ICDM (-.06). This item seemed to indicate that students who used memorization strategies fit into the SWM

module, while neither ILM nor ICDM-students (consistently) apply this memorization strategy. Item #2 (above) actually loaded on ICDM (.30) instead of ILM (-.07) or SWM (-.10). This observation would seem to indicate that ICDM students also use intentional strategies (ILM). Item #3 (above) predictably loaded on ICDM (.31), while not showing any significant loading on SWM (.09) nor on ILM (.01).

An example of an item that was predicted to load on ILM is as follows (again, other items from the same category are included for comparison):

Category #5--New Concepts: Organizing a Term Paper

1. Most of the time spent on choosing and organizing ideas for a term paper goes to rewriting what others have written without changing their original ideas. [SWM]

*2. When choosing and organizing ideas for a term paper, it is hard to decide what the teacher wants. [ILM]

3. In choosing and organizing ideas for a term paper, the most difficult part is to focus on what is compelling to me regardless of whether I think the teacher would agree with it. [ICDM]

Item #2 above loaded on ILM at a value of .45. There was no significant loading on SWM (.19) or ICDM (-.001). Hence, the question seemed to appropriately identify the type of strategy expected with ILM students. Contrary to expectations, item #1 showed no significant loading on SWM (.21). Neither did it load on ILM (.20) or ICDM (-.08). These values would seem to point

out that both SWM and ILM students might moderately employ the strategy indicated by item #1 (quoting other authorities in writing term papers), while ICDM-students do not follow this learning conception.

An example of an item that was designed to load on ICDM is as follows (for the sake of comparison, other members of the same category are included):

Category #2--Focus on Purpose in Study

1. When I study I think about what might appear on an exam. [SWM]
2. When I study I relate new course material to previously learned course material. [ILM]
*3. When I study I often consider how the new material changes my understanding of the subject matter and of myself. [ICDM]

Item #3 above loaded on ICDM at a value of .44. There were no significant loadings of this item on either SWM (-.25) or on ILM (.10). Hence, an ICDM student-approach to learning seems to indicate that these students approach learning in a holistic manner. Comparatively, item #1 above showed no sigificant loading on SWM (.09), ILM (.12), nor ICDM (.08). Admittedly, this was a surprising observation. Item #2 above actually loaded on ICDM (.42) instead of ILM (-.17) as predicted. This phenomenon is not really so surprising as it appears at first, however, in that ICDM conceptual approach would not be inconsistent with item #2 (namely, synthezing new subject matter

with old subject matter). An ILM conceptual approach, on the other hand, probably uses discreet and incremental approaches to learning. Further refinement of the items and an additional pilot study will help identify further distinctions.

In summarizing the results, the Eigenvalues showed groupings of three factors. An analysis of the loadings based on categories of three questions (items) each, indicated that while there was some sharing of loadings among individual items, the significant items (i.e., with values between .29 and .65) indicated discrimination among the three factors. Some items showed loading on none of the three factors. Another interesting but not surprising observation is that ICDM factor shared loading with SCM-factor on only one item (between values of .29 and .65), namely, "I like teachers who make it very clear what they expect."

DISCUSSION AND CONCLUSIONS

This study started with the hypothesis that three conceptions of learning, SWM, ILM, and ICDM, were discrete approaches used by college students in their academic work. We feel that this theoretical construct has been somewhat supported.

With regard to question number #2, that is, which of the above learning approaches is employed by college students, it is apparent that all three are utilized. Based on the loadings only eight items showed significant usage of SWM, only seven items showed significant usage of ILM, while 15 items showed

significant usage of ICDM. Several possibilites may be surmised from this observation. First, affective and value-oriented considerations may be involved. That is to say, even students who probably use SWM and ILM predominantly, feel that they ought to be using a holistic approach to learning in a college context. Second, if SWM and ILM may actually be considered on the basis of a theoretical continuum (an observation which Bereiter [1990] himself suspects), the significant items between SWM/ILM versus ICDM are evenly distributed. To extend Bereiter's suspicion, ILM/SWM-approach probably shares some elements with ICDM items. In other words, ICDM may reflect an incorporation of learning conceptions from SWM and ILM; or, ICDM users have reinterpreted the questions within their own approach.

FUTURE STUDY

This has been an interesting and exciting study for the authors. It was an initial pilot study to measure the learning conceptions of students. Yet, further research is anticipated as we plan to revise the questions and the response format, as well as include additional personal data from the subjects. Planned future research with additional hypotheses will investigate the relationship between LCI and GPA and a personality type instrument.

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Table 1
Number of Items in Each Factor with Significant Loading Values

	Factors		
	ICDM	SWM	ILM
Number of Items	20	13	18
Loading Value	.29 - .59	.32 - .65	.29 - .42

Table 2
Examples of Items Predicted to Load on SWM, ILM, and ICDM

Factor A: School Work Module (SWM)

Category #6--Memory

1. In order to remember something new for a test, I repeat it several times until I know it.

   Loading values: SWM - .44
   ILM - .07
   ICDM - -.06

2. In order to remember something new for a test, I try to relate it to something the teacher has said or that I have already read in the textbook. [ILM]
3. In order to remember something new for a test, I try to think of a metaphor that will help me recall it. [ICDM]

Factor B: Intentional Learning Module (ILM)

Category #5--New Concepts: Organizing a Term Paper

1. Most of the time spent on choosing and organizing ideas for a term paper goes to rewriting what others have written without changing their original ideas. [SWM]
2. When choosing and organizing ideas for a term paper, it is hard to decide what the teacher wants.

   Loading values: SWM - .19
   ILM - .45
   ICDM - -.001

3. In choosing and organizing ideas for a term paper, the most difficult part is to focus on what is compelling to me regardless of whether I think the teacher would agree with it. [ICDM]

Factor C: Interest Creating Discovery Module (ICDM)

Category #2--Focus on Purpose in Study

1. When I study I think about what might appear on an exam. [SWM]
2. When I study I relate new course material to previously learned course material. [ILM]
3. When I study I often consider how the new material changes my understanding of the subject matter and of myself.

   Loading values: SWM - -.25
   ILM - .10
   ICDM - .44